3D models related to the publication: Morphology of the human embryonic brain and ventricles

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Abstract: The present 3D Dataset contains the 3D models analyzed in : Shiraishi N et al. Morphology and morphometry of the human embryonic brain: A three-dimensional analysis, NeuroImage, 115, 2015, 96-103, DOI: 10.1016/j.neuroimage.2015.04.044.

Key words: human brain, human embryo, magnetic resonance imaging, three-dimensional reconstruction

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SPECIMEN LIST

The morphogenesis of the cerebral ventricles was visualized using images derived from human embryo specimens between Carnegie stage (CS) 13 and 23 from the Kyoto Collection (Congenital Anomaly Research Center, Graduate School of Medicine, Kyoto University), which were acquired with a magnetic resonance microscope equipped with a 2.35-T superconducting magnet.

Specimen ids	Species	Developmental Stage
M3#24_KC-CS13BRN50455	*Homo sapiens*	Carnegie stage 13
M3#25_KC-CS14BRN18834	*Homo sapiens*	Carnegie stage 14
M3#26_KC-CS15BRN19975	*Homo sapiens*	Carnegie stage 15
M3#27_KC-CS16BRN7870	*Homo sapiens*	Carnegie stage 16
M3#28_KC-CS17BRN26702	*Homo sapiens*	Carnegie stage 17
M3#29_KC-CS18BRN25914	*Homo sapiens*	Carnegie stage 18
M3#30_KC-CS19BRN16508	*Homo sapiens*	Carnegie stage 19
M3#31_KC-CS20BRN26581	*Homo sapiens*	Carnegie stage 20
M3#32_KC-CS21BRN33434	*Homo sapiens*	Carnegie stage 21
M3#33_KC-CS22BRN27960	*Homo sapiens*	Carnegie stage 22
M3#34_KC-CS23BRN28189	*Homo sapiens*	Carnegie stage 23

METHODS

Well-preserved human embryos between CS 13 and CS 23 were selected from Kyoto Collection for MR microscopic imaging (Nishimura et al, 1968; Shiota et al, 2007; O'Rahilly and Müller, 1987). The MR images of the embryos were acquired using a super-parallel MR microscope developed with a 2.35 T horizontal bore (40 cm) superconducting magnet (Matsuda et al., 2007). The brain tissue and ventricles were segmented for 3D reconstruction using FSL View of FMRIB Software LibraryTM (ver. 4.1.9, Analysis Group, FMRIB, Oxford, UK). Three-dimensional morphology of the brain tissue and ventricles were computationally reconstructed with AmiraTM software (ver. 5.4.0, Visage Imaging, Berlin, Germany). The 3D surface models were then processed with ISE-MeshTools (Lebrun, 2014); each model was orientated, tagged and labelled using this software. All tagged surfaces are provided in .vtk format, and labels in .flg format. All 3D surface models are also provided in .ply format, and can therefore be opened with a wide range of freeware. Representative lateral view of the brain tissue and ventricles are shown in Figure 1.
This study was approved by The Committee of Medical Ethics of Kyoto University Graduate School of Medicine, Kyoto, Japan (E986).

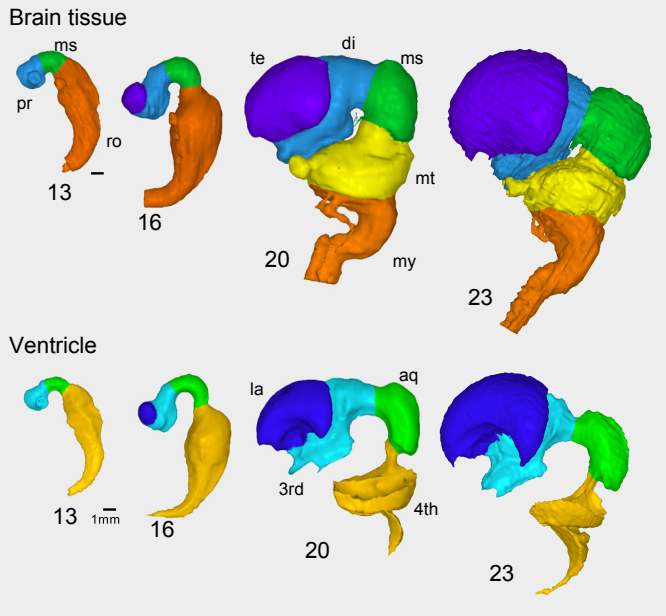

Figure 1: Representative lateral view of the brain tissue and ventricles. pr; prosencephalon, ms; mesencephalon, ro; rhombencephalon, te; telencephalon, di; diencephalon, mt; metencephalon, my; myelencephalon, la; lateral ventricle, 3rd; third ventricle, aq; aqueduct of midbrain, 4th; fourth ventricle.

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